
## 1) Summary of instrument/model performance by flight

- Successfully integrated quickly on new aircraft despite delayed funding decision
- 100% instrument uptime during ORACLES
- Extended 10 GHz (B) saturation (> 1 hr) during 9/2, 9/6, 9/8, 9/14, 9/18, 9/20 – primarily low-altitude legs
- 37 GHz channels compromised during APR transmit – recovery of thinned data possible

## 2) Status/Plans for data archiving, analysis and presentation; need for correlative data

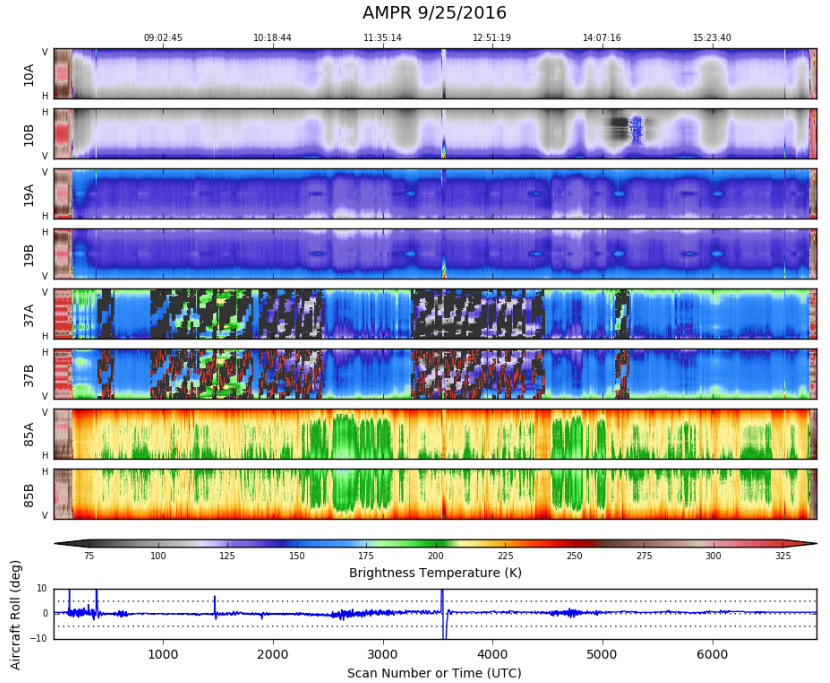
- Complete R4 dataset, with radome compensation, geolocation, and H & V deconvolution archived on ESPO servers
- Includes QC flags, land/water fraction in pixel FOV, and documentation
- Software available at https://github.com/nasa/PyAMPR
- Any remaining R1 files on ESPO servers are from non-flight days and have no radome compensation or geolocation
- Will be final major update to ORACLES 2016 dataset w/out additional support (i.e., no 37 GHz recovery during APR transmit)
- Minor updates still possible

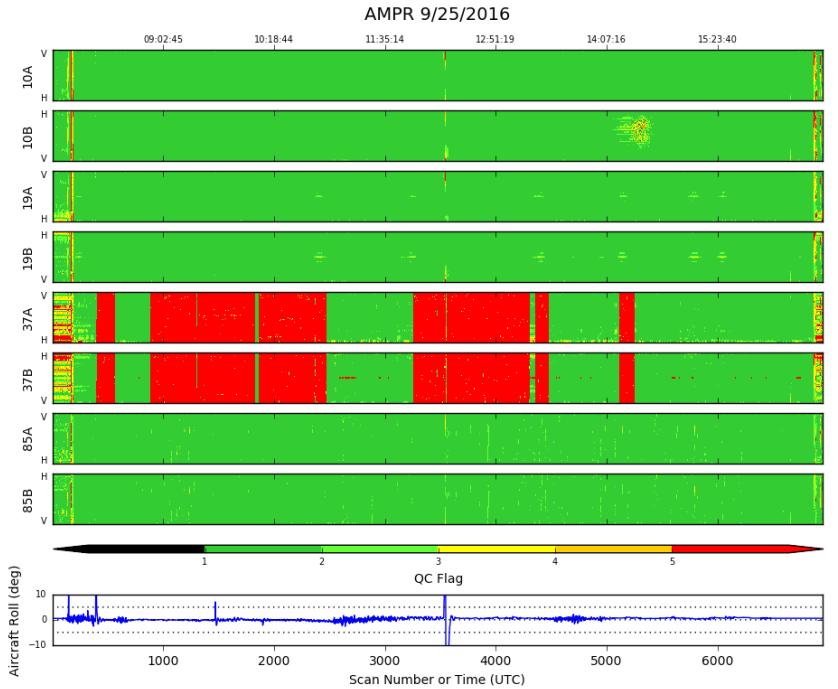
**3) Issues for 2018 deployment (for P-3 instruments and modelers)**

- Participation in ORACLES 2018 possible but contingent on outside (e.g., ACE) support
- Require long-lead funding decision (~4+ months) to procure optimized radome and add 37-GHz filters
- Feasible to provide near-real-time data locally on aircraft
- Other enhancements (e.g., scanning changes, cold load stability) possible but also require long lead time
- Pending CAMP$^2$Ex proposal

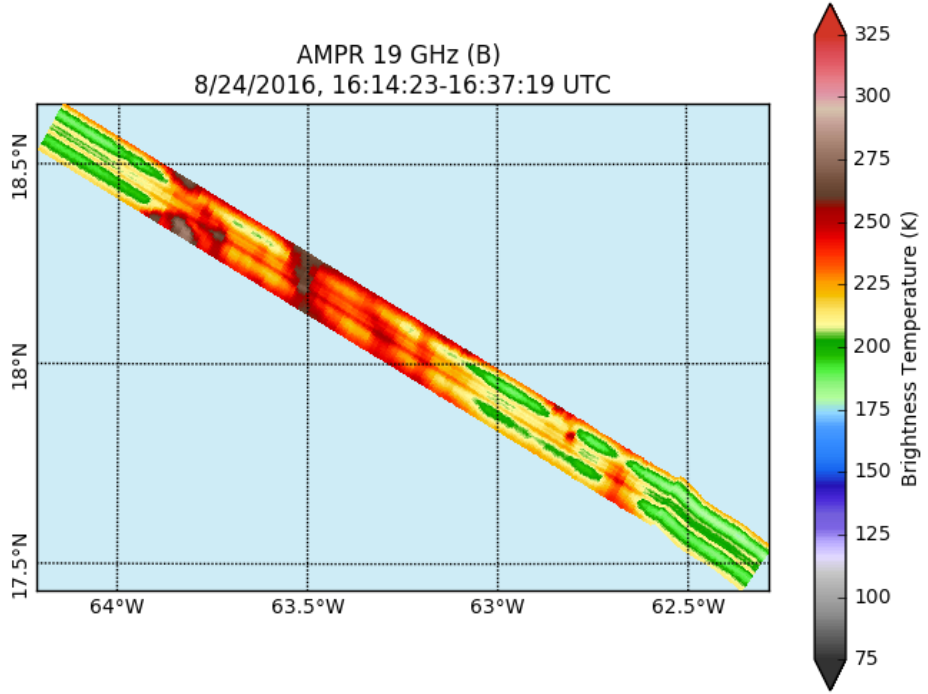
**4) Highlights, nuggets, golden days from your instrument/model's point of view**
**5) Initial ideas for more detailed scientific analyses and future publications (likely related to 4)**

- Best overall performance at stable high altitudes – e.g., transits, portions of routine flight pattern days
- Heavy precip signatures observed during transits
- Water vapor, cloud, and drizzle signatures observed throughout campaign
- Unique, high-resolution views of clouds/precip
- AMPR science will be driven by other ACE/ORACLES investigators – e.g., JPL, Utah, Wisconsin; Combined radar/radiometer analysis



Before

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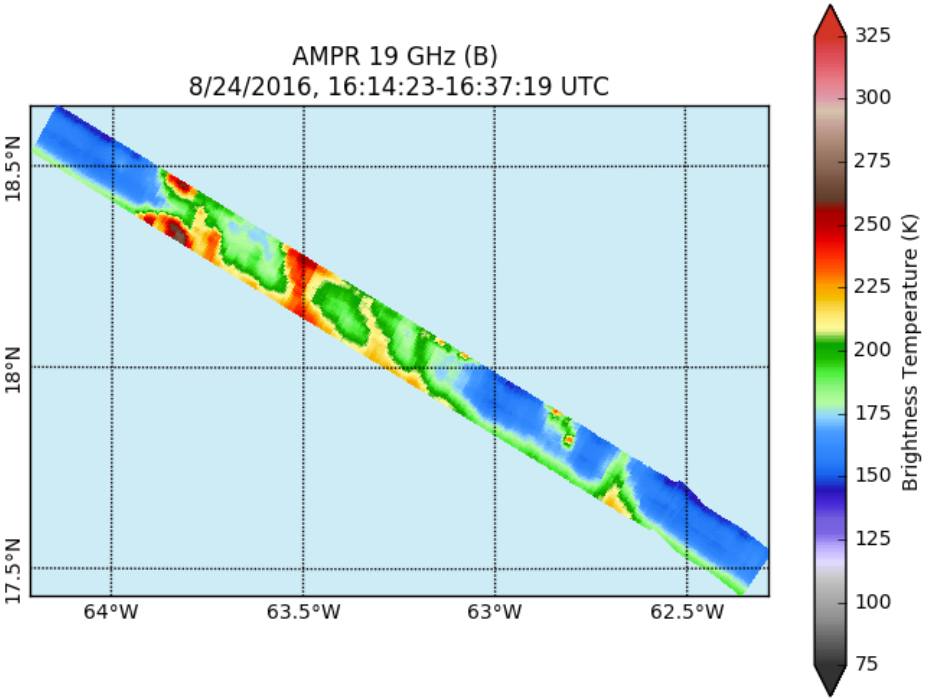
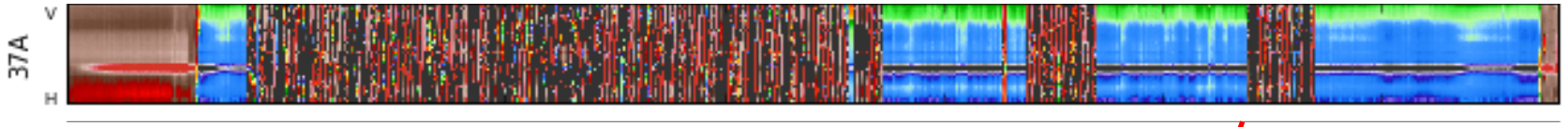



# Radome Compensation

- Unoptimized L-band radome introduced artificial streaks in the raw data
- This effect was compensated for using a combination of radome loss measurement before ORACLES campaign and comparing the flight measurements with an expected radiative transfer model output over clear ocean scenes
- Due to varying altitude (and ambient temperature) of the P3 flights multiple corrections were applied
- We do not expect the R4 dataset to be valid over land

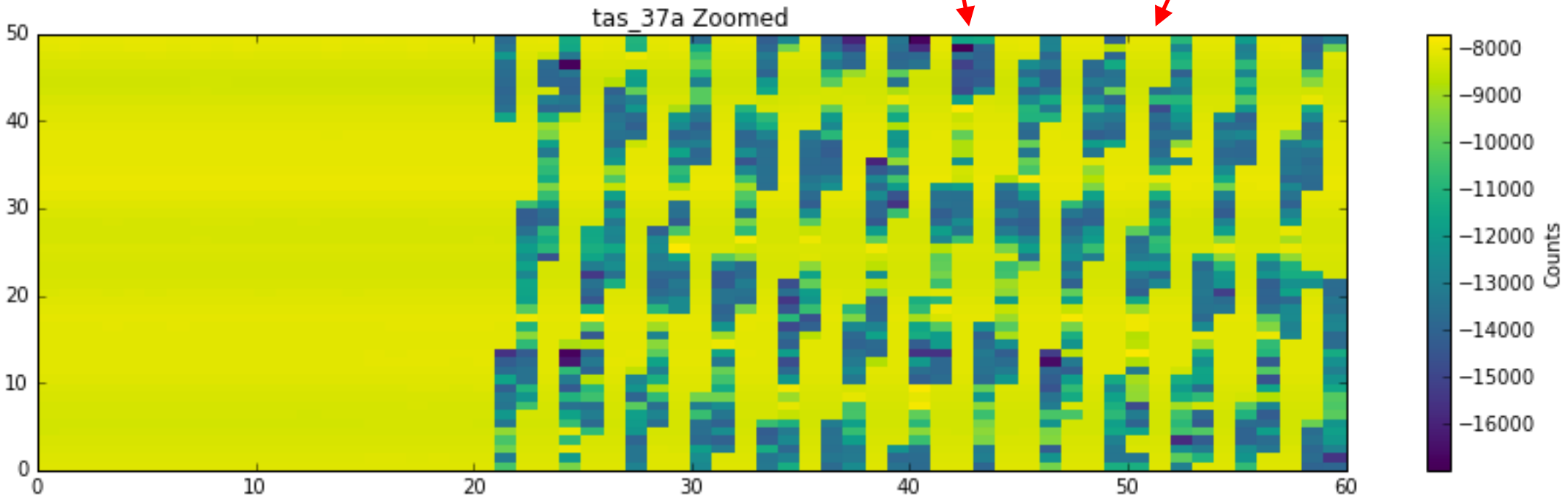



**37.1 GHz Data Thinning Ideas**

- Valid scene counts when APR-3 Ka not transmitting
- Load counts stable over the course of several minutes
- Use load views from outside transmit period, together with thinned scene counts, to recover Tb
- Reconstruct pseudo-scans from multiple successive scans

APR-3 Transmit

Clean



# DATA EXAMPLES

**AMPR Data Example 9/12/2016**

**Descent through cloud layer**

**Radome-compensated 85 GHz observations**

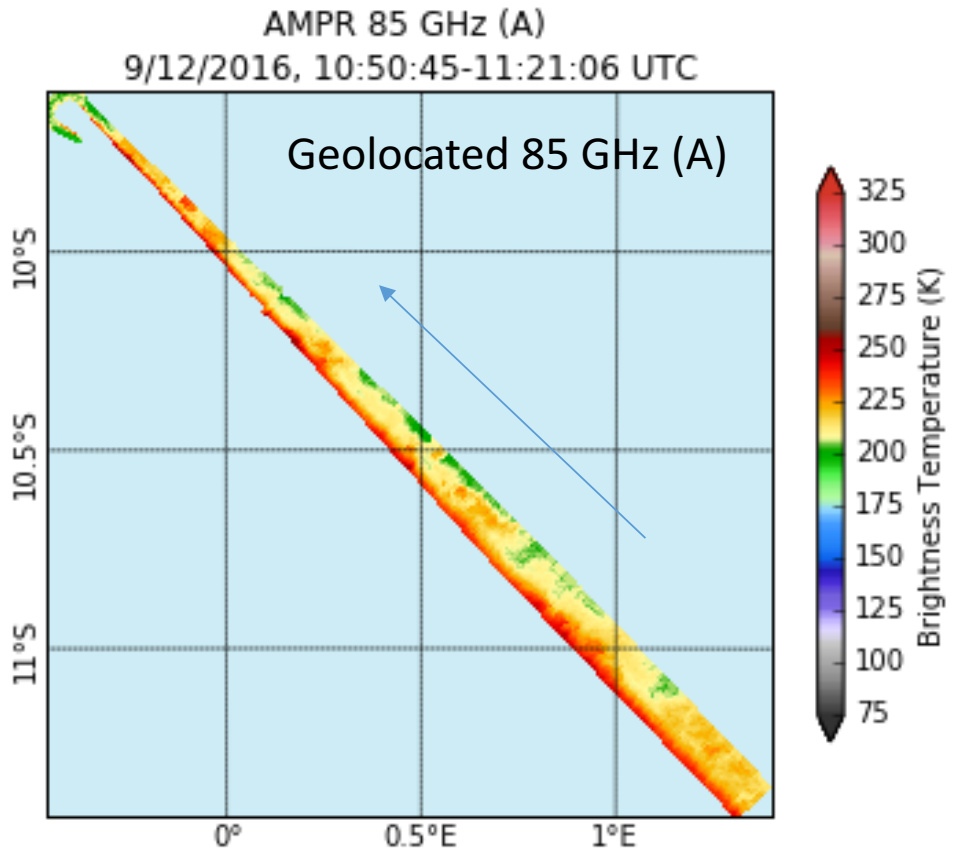
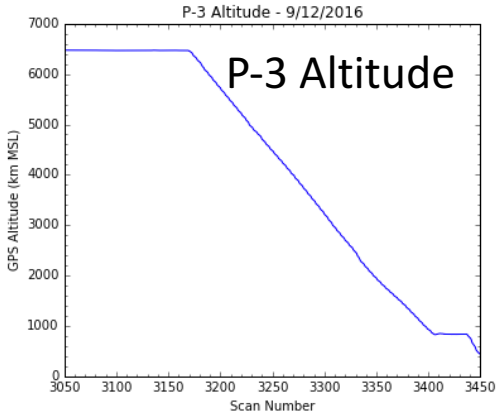
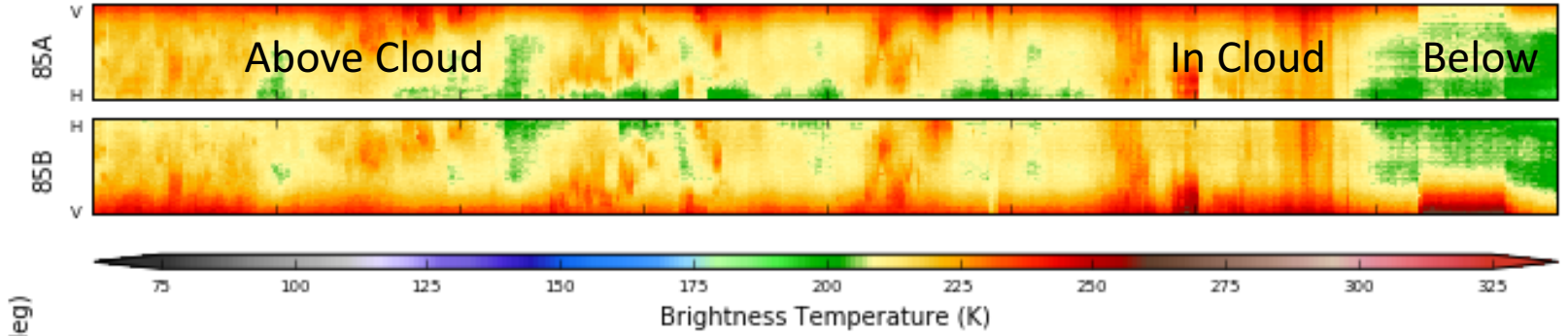



Photo during descent
*Michal Rozenhaimer*

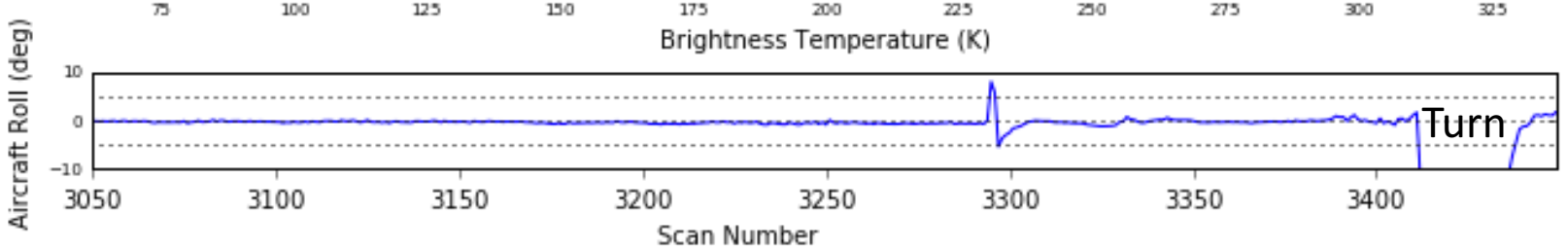



*AMPR analysis by Timothy Lang and Sayak Biswas NASA MSFC*

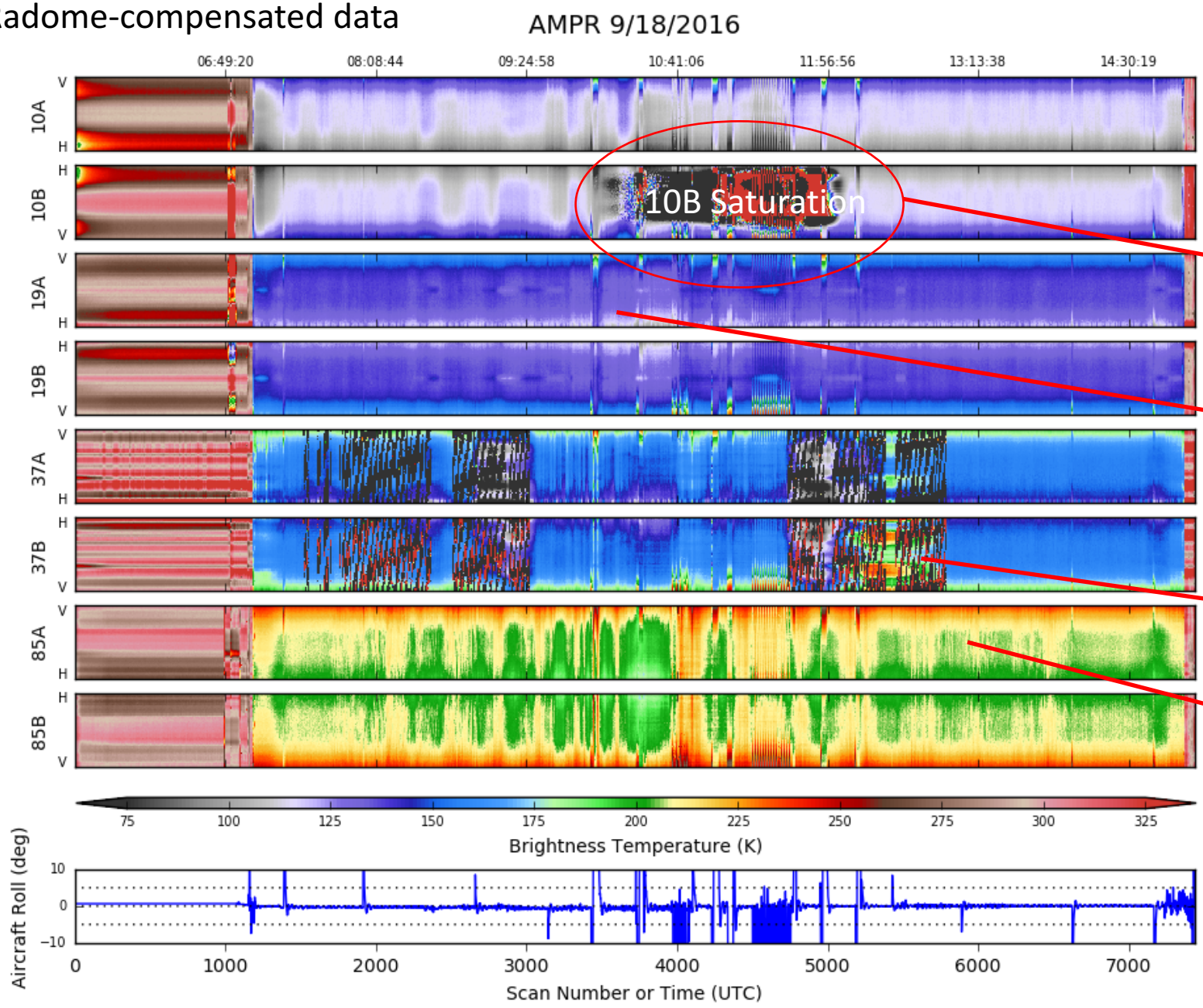
Strip Chart 85 GHz A & B Channels

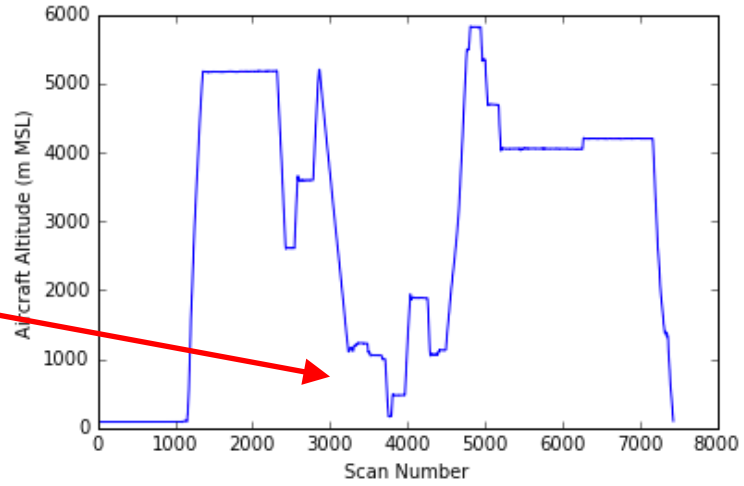



P-3 Roll Angle



Radome-compensated data




19 GHz typically shows water vapor enhancements during northward trek

APR-3 Ka transmit

85.5 GHz (A) worked much better than expected. Expected more noise due to radome reflections based on pre-ship testing.

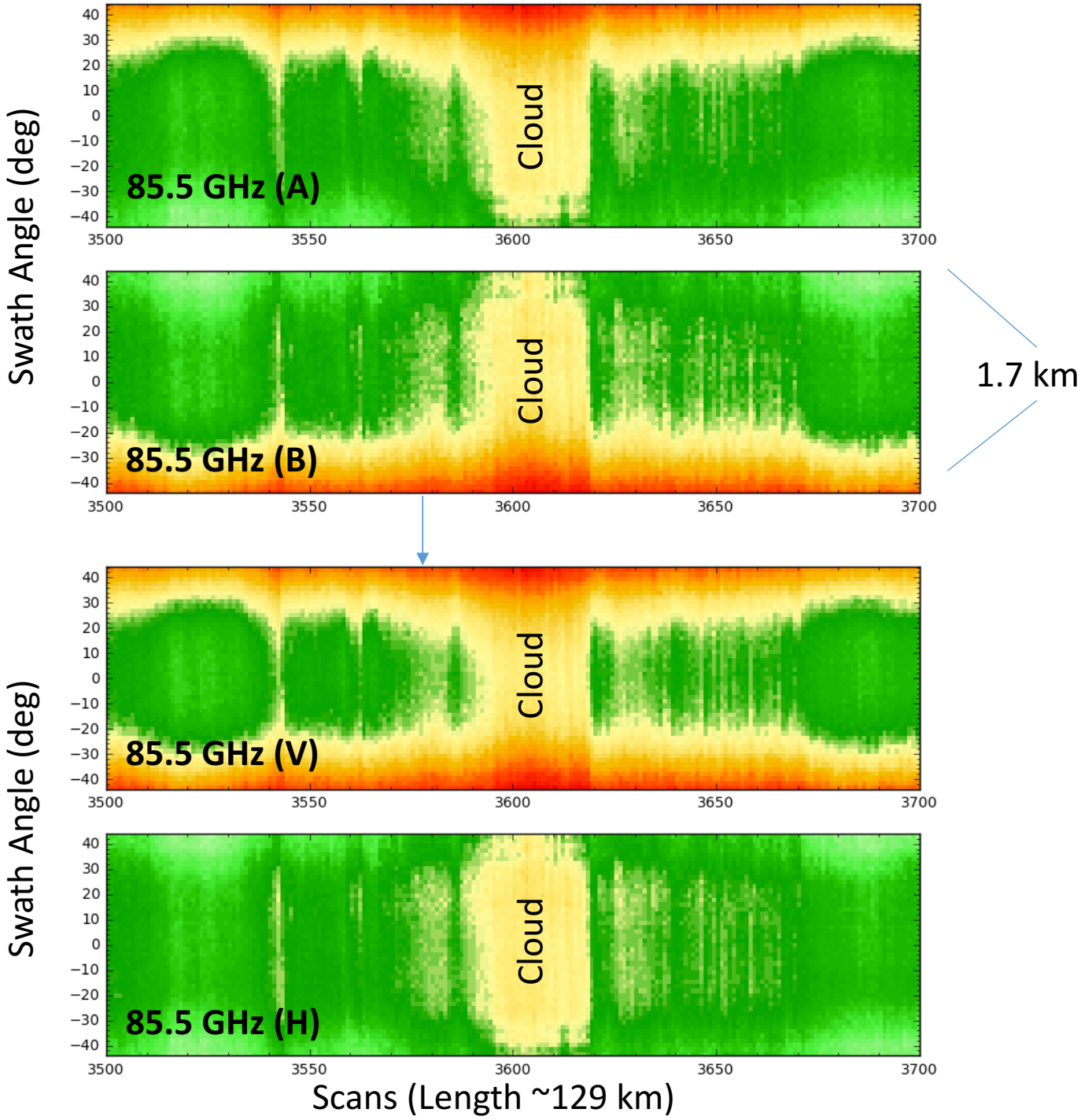
# Polarization Deconvolution

A & B are mixed pol
A is left edge V, right H
B is opposite

- Deconvolution to pure V and pure H is based on geometric approach
- Geophysical retrievals need to further account for variable incidence angles as well as aircraft altitude
- MSFC has working retrievals for OLYMPEX (ER-2) flights

9/18/2016
10:03-10:18 UTC

Altitude ~1050 m MSL



# SUMMARY

- Final AMPR dataset for ORACLES 2016 on ESPO servers. Use R4 - it has radome compensation, polarization deconvolution, and flagging. If R4 not available the files are from ground tests only.

- For geophysical retrievals, or for 37-GHz RFI mitigation, please contact the AMPR team for advice. Both are viable for individual cases, but someone else either needs to do the work or provide support to MSFC to do it.

- AMPR not flying in ORACLES 2017, but is potentially available for 2018.

- AMPR is a significant project at MSFC. If you plan to use the final version of these data in a publication, please contact the PI (Timothy Lang, timothy.j.lang@nasa.gov) to discuss potential assistance and co-authorship.